$$V_{FL}^{lo} = \max\left[\max_{\substack{i<j\\ s=\pm 1}} \left\{ \frac{-(a_j + s a_i)^T y}{1 + s\, i/j} \right\},\ \max_{\substack{i>j\\ s=\pm 1}} \left\{ \frac{-(a_j + s a_i)^T y}{1 + s\frac{n-i}{n-j}} \right\} \right]$$

(×s on both sides) (×s on both sides)

$$\frac{-s}{s + i/j} a_j^T y + \frac{-1}{s + i/j} a_i^T y = \frac{-sj}{sj+i} a_j^T y + \frac{-j}{sj+i} a_i^T y$$

$$\frac{-s}{s + \frac{n-i}{n-j}} a_j^T y + \frac{-1}{s + \frac{n-i}{n-j}} a_i^T y = \frac{-(n-j)s}{(n-j)s+(n-i)} a_j^T y + \frac{-(n-j)}{(n-j)s+(n-i)} a_i^T y$$

$$= \max\left[\max_{\substack{i<j\\ s=\pm 1}} \left\{ \frac{-sj}{i+sj} a_j^T y + \frac{-j}{sj+i} a_i^T y \right\},\ \max_{\substack{i>j\\ s=\pm 1}} \left\{ \frac{-s(n-j)}{(n-j)s+(n-i)} a_j^T y + \frac{-(n-j)}{(n-j)s+(n-i)} a_i^T y \right\} \right]$$

×s on both sides

$$= \max\left[\max_{\substack{i<j\\ s=\pm 1}} \left\{ \frac{-j}{j+si} a_j^T y + \frac{-sj}{j+si} a_i^T y \right\},\ \max_{\substack{i>j\\ s=\pm 1}} \left\{ \frac{-(n-j)}{(n-j)+s(n-i)} a_j^T y + \frac{-s(n-j)}{(n-j)+(n-i)s} a_i^T y \right\} \right]$$

Ryan's original version ↴ (is how they differ)

$$V_{FL}^{\text{lo}} = \max\left\{ \max_{i<j,\, s\in\{-1,1\}} \left\{ \frac{si}{j+si} a_j^T y + \frac{sj}{j+si} a_i^T y \right\},\right.$$

$$\left. \max_{i>j,\, s\in\{-1,1\}} \left\{ \frac{s(n-i)}{(n-j)+s(n-i)} a_j^T y + \frac{s(n-j)}{(n-j)+s(n-i)} a_i^T y \right\} \right\}.$$